CITY OF SAN ANTONIO
DEPARTMENTS OF CAPITAL IMPROVEMENTS MANAGEMENT SERVICES AND SOLID WASTE MANAGEMENT
CONTRACT SERVICES DIVISION

Nelson Brush Site Project
Addendum 2

This addendum shall be included and considered part of the plans and specifications for the above named project. The contractor shall be required to sign the acknowledgement of this addendum and return it with the bid package.

The reason for **Addendum 2** is to respond to questions from the Bidders, and to make clarifications or modifications to the bid documents, technical specifications, and drawings. This Addendum includes the following changes to the bid documents:

BIDDER QUESTIONS AND RESPONSES

1. Question: Does the scope of work include the use or removal of the stock piled material at the site.
   Response: The Technical Specifications and Addendum 1 address the use or removal of the stock piled material at the site. One of the existing on site stockpiles will be removed by the City of San Antonio prior to the Contractor starting construction. The other stockpile(s) will be used by the Contractor on this project or moved by the Contractor to an approved area outside the project limits and outside of the floodplain.

2. Question: How does the tree preservation plan affect the scope of work.
   Response: The tree preservation plan includes, but is not limited to, the following:
   - Provides locations and description of the trees on the project site.
   - Indicates which trees are not to be removed during construction.
   - Provides details and procedures required to protect trees designated to remain.

3. Question: Is a geotechnical survey for the site available.
   Response: A copy of the geotechnical report is attached and made part of this Addendum.

4. Question: Are all material testing costs to be included in the proposal.
   Response: The plans and specifications do require the Contractor to hire and pay for the services of an independent materials testing company to perform materials testing. Refer to the plans and specifications for testing requirements.

5. Question: What is the intended road width: Sheet C-3 shows 20 feet and Sheet C-2 shows 30 feet.
   Response: The road width of the perimeter road is 30 feet. The 20 foot dimension on Sheet C-3 is indicating the width of the fire line, which is centered within the 30 foot paved road.

6. Question: Does the proposed road require a curb.
Response: The proposed perimeter road does not include a curb. Curb and gutter is required in the vicinity of the truck scales along a portion of the access road, see Sheet C-6. Curbing is required in portions of the parking and access areas around the future site office. See revised sheet C-5 included in Addendum 1 for locations and a detail of the proposed curb.

7. Question: Please clarify limits of fence work and materials.
Response: We believe the limits of fence work were indicated clearly on the existing civil drawings and details of the fences and gates were shown on Sheet C-19. .

8. Question: Will engineering be required by the Contractor.
Response: The plans and specifications are provided in the contract documents to construct the project.

9. Question: Is the Contractor responsible for permitting fees.
Response: The Contractor is not responsible for building permit fees but is responsible for any other fees included, but not limited to, scheduling inspections with the City of San Antonio, CPS, temporary utilities, and TCEQ. Refer to the plans and specifications.

CITY OF SAN ANTONIO
DEPARTMENTS OF CAPITAL IMPROVEMENTS MANAGEMENT SERVICES
AND SOLID WASTE MANAGEMENT
CONTRACT SERVICES DIVISION

RECEIPT OF ADDENDUM NUMBER(S) **2** IS HEREBY ACKNOWLEDGED FOR PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF **Nelson Brush Site Project**

FOR WHICH BIDS WILL BE OPENED ON **January 26, 2011**

THIS ACKNOWLEDGEMENT MUST BE SIGNED AND RETURNED WITH THE BID PACKAGE.

Company Name: ______________________________

Address: _________________________________

City/State/Zip Code: ___________________________

Date: _______________________________________

Signature: __________________________________

Print Name/Title: ______________________________

REPORT OF

SUBSURFACE EXPLORATION

NELSON BRUSH SITE

SAN ANTONIO, TEXAS

[redacted]

GEOTECHNICAL CONSULTANTS, INC.
11918 Warfield Drive, San Antonio, Texas 78216
Office (210) 344-8144 fax (210)349-6151

GEOTECHNICAL CONSULTANTS, INC.
11918 Warfield Drive, San Antonio, Texas 78216
Office (210) 344-8144 Fax (210) 349-6151
Toll Free: 1-888-525-7955
www: geotechnicalconsultantsinc.com

November 17, 2010

HES Engineered Services and Solutions
22622 Sueno
San Antonio, Texas 78256

Attention: Mr. Paul Hartnett

Subject: Report of Subsurface Exploration
Nelson Brush Site
San Antonio, Texas
TBPE Registration: F-409
Project Number: 10288

Dear Mr. Hartnett;

Results of the subsurface exploration at the Nelson Brush Site in San Antonio, Texas for the proposed buildings, scales, and pavement are presented in this report.

We appreciate the opportunity to assist in this project. Please call us if you have any questions or if we may be of further service.

Very truly yours,
GEOTECHNICAL CONSULTANTS, INC.

Sarah S. Hancock-Gamez, P.E.

John W. Dougherty, P. E.

Copies submitted: (2) - Client

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Report of Subsurface Exploration
Nelson Brush Site
San Antonio, Texas
TBPE Registration: F-409
Project Number: 10288

INTRODUCTION

Authorization and Scope

A subsurface exploration at the Nelsons Brush Site in San Antonio, Texas, was authorized on October 1, 2010, by Mr. Paul Hartnett, president of HES Engineered Solution, Inc. The purposes of the study were to determine the characteristics of the subsurface soils, to interpret these data, and to develop recommendations for site preparation and foundation design for the new buildings and scales.

Description

We understand the project will consist of a new concrete scale, concrete scale building, new asphalt pavement and crew quarters. Pavement will be used for parking at the front of the building and new pavement in existing gravel road. Structural loads are estimated to be light to moderate.

SUBSURFACE EXPLORATION AND TESTING

Field Testing

Subsoils were explored by drilling six soil test borings at the approximate locations shown on the soil boring location plan in the appendix. Boring B-1 was drilled to 15-feet at the brush piles. B-2 was drilled at the mulch piles, B-4 was drilled at the crew quarters, and B-6 was drilled on the gravel road; all were drilled to depths of 25-feet. B-3 was drilled to 10-feet at proposed road, and B-5 was drilled to 17-feet at the truck scales and building. Elevations at the boring locations were not determined.

The borings were advanced using a continuous flight, power auger using a continuous flight, power auger and samples were obtained by solid stem auger and split barrel sampling with standard penetration testing. Field sampling and testing followed applicable ASTM standards. Test boring logs are presented in the appendix along with descriptions of the test methods.

Laboratory Testing

Soil samples were visually classified by our engineer and samples of the various soil strata were selected for laboratory testing. Atterberg limit tests and sieve analysis results were conducted on several samples and moisture content tests of all samples were completed to assist in classifying the soils and to provide indicators of soil behavior. Test results are presented on the boring logs and on the sheets titled sieve analysis results found in the appendix. Descriptions of the test procedures are also included in the appendix.

SITE AND SUBSURFACE CONDITIONS

Site Conditions

The site is relatively flat with vegetation consisting of native trees and grass. A built up area of fill material was on the west side of the property.

Area Geology

According to the *Geologic Atlas of Texas*, this site is underlain by Holocene Era deposits of the Quaternary System. These are fluviatile terrace deposits that include gravel, sand, silt, and clay and, next to the Edwards Plateau, materials are predominantly gravel, limestone, dolomite, and chert. Increasing amounts of sand, silt, and clay are found southeastward near Tertiary rocks. The low terrace deposits are mostly above flood levels along entrenched streams and fluviatile morphology is well preserved with point bars, oxbows, and abandoned channel segments. Most rivers below the Balcones escarpment are entrenched and do not have active flood plains; some exceptions are the Nueces River, part of Medina River, and San Antonio River below the mouth of Medina.

Subsurface Conditions

At B-6, 16-inches of asphalt was encountered. Three soil strata were encountered within the boring depths and these are described below.

- ❑ *Dark Brown, Silty Clay* – Dark brown, silty clays were encountered from the surface to ten feet at B-1, eight feet at B-2, four feet at B-3, B-4, and B-6, and 15-feet at B-5. Slightly gravelly and sandy soils were encountered.

  Five samples had liquid limits of 24 to 53 and plastic indices of 12 to 31. These soils are classified as low plasticity clays, CL, for the samples having liquid limits lower than 50 and CH for the sample having the liquid limit over 50, according to the Unified Soil Classification System. Moisture contents for the samples were 6 to 22 percent. Two fines fraction (silt and clay sized particles) results were 57.9 and 74.5 percent.

  Consistency of the stratum is very stiff to hard with hand penetrometer test results of three to more than the 4-1/2 tons per square foot capacity of the testing device. Standard penetration tests were 14 to 40 blows per foot of penetration to 50 blows per 3-1/2 to 5-1/2 inches of penetration.

- *Dark Tan to Tan, Silty Clay* – Dark tan to tan, silty clays next extend to 22-feet at B-2, 8-1/2 feet at B-3, to the 25-foot depths drilled at B-4 and B-6.

  Six samples had liquid limits of 20 to 40 and plasticity indices of 8 to 22. These soils are classified as low plasticity, CL, clays according to the Unified System. Moisture contents in this stratum were 7 to 27 percent.

  Consistency of the stratum is hard with standard penetration tests of 21 to 79 blows per foot of penetration to 50 blows per five inches of penetration.

- *Weathered Limestone* – Weathered limestone was encountered to the 15-foot depth drilled at B-1, to the 25-foot depth drilled at B-2, ten foot depth drilled at B-3, and to the 17-foot depth drilled at the B-5.

  Moisture contents of the limestone were 7 and 8 percent. One fines fraction test result was 55.7 percent. Consistency of the stratum is hard with one standard penetration test of 75 blows per foot of penetration.

The above descriptions are generalized to highlight the major subsurface stratification and engineering properties of the subsoils. Boring logs should be consulted for specific information at each boring location.

Groundwater

Groundwater was encountered in boring B-4 during drilling at about 25-feet and stabilized at 19-feet after 24 hours of drilling. Groundwater levels will fluctuate with seasonal climatic variations.

EVALUATION

Evaluation

Soils underlying this site are low plasticity, silty clays extending to 25-feet bearing on weathered limestone. Shallow plastic clay soils may, depending upon plasticity, unit weight, stress history, in situ stress, and moisture condition, exhibit volume change (shrinking and swelling) with changes in soil moisture. Volume change potential decreases with depth as the overburden pressure increases and the range of seasonal moisture variation decreases.

These conditions are suitable for the use of a stiffened slab-on-grade foundation to support the new crew quarters and scales buildings. Foundation recommendations presented below are extended to provide foundations that can resist moderate soil movements without excessive foundation deflection. The recommended site improvement removes the soil having the largest potentials for shrinking and swelling provide a stable soil pad to distribute the strain from swelling soil over a larger foundation area.

RECOMMENDATIONS

Site Preparation

Building site preparation should initially consist of the removal of soils with significant amounts of organic material. Ten percent by volume is considered a significant amount of organic material. Construction of building pads that provide a minimum of 24 inches of a low plasticity, sandy clay, sand and gravel, or crushed limestone fill beneath the floor slab, is also recommended.

Fills should be placed as soon as stripping and soil removal is completed so the soils at the bottom of the excavation are not allowed to dry excessively. The excavation bottom should be scarified and the soils compacted as recommended for compacted fill.

Selection and Placement of Fill

The fill should be gravel or crushed limestone. Recommended fill specifications are included in the appendix and these may be used as a guide for selection and placement of fill.

Potential Vertical Rise (PVR)

Potential vertical soil movements have been estimated using the Texas Department of Transportation method TEX-124-E, Potential Vertical Rise. This method utilizes the in situ soil moisture conditions and plasticity characteristics within the active zone. It is estimated that depth of the active zone in this area is approximately ten feet. The estimated potential Vertical Rise (PVR) values is approximately one inch for the theoretical dry moisture condition, one-half inches for the theoretical average moisture, and less than one inch for the theoretical wet moisture condition. A surcharge load of two pounds per square inch was assumed to be supplied by the floor and sustained live load of the severity of potential soil movements at this site and are not intended as a prediction of actual soil and foundation movements.

Slab-on-Grade Foundation Design

Stiffened slab-on-grade foundations may be designed using beam sizes and spacing, slab thickness and reinforcing steel used in foundations for similar structures with similar soil conditions. A number of design methods, as the Building Research Advisory Board Design, have been proposed which are based upon beams on elastic foundation models which produce reasonable estimates of the stresses in the foundation. Allowable soil bearing pressures of 2,500 pounds per square foot are recommended for the natural clay soils and select fill. Not including the high plasticity sample at the brush piles at B-1, the weighted or effective plasticity index for the unimproved site is 23.

Stiffening beams should be a minimum of 12 inches wide and bear at a minimum of 18 inches below the exterior finished grade in compacted structural fill or natural subgrade. Stiffening beam excavations should be cleaned of any loose soil and should be inspected by the soils engineer to verify that the recommended soil bearing capacity exists at the actual beam bearing elevation. We recommend the use of a vapor barrier in areas to receive a floor covering or concrete surface treatments.

Recommendation for the Scales

Concrete, cast-in-place, straight shaft drilled piers are recommend to limit any foundation movements for the scales. Piers should be designed for end bearing only and piers should be reinforced full length to resist uplift forces. A minimum steel area equivalent to 1-percent of the shaft area is recommended. A bearing capacity up to 15 kips per square foot may be used for pier design. Piers should bear on the light tan, silty clay at depths of 15-feet.

PAVEMENT RECOMMENDATIONS

General

The specifications for the various pavement components are detailed in the following sections. Five and 10 daily equivalent 18-kip axle loads were used for light automobile parking and heavy duty pavements, respectively. A CBR value of three was used for pavement design.

Subgrade Preparation

All existing topsoil and vegetation should be removed and wasted. The areas to be paved should then be graded to the required subgrade elevations. Exposed subgrade should be scarified and recompacted to densities equal to at least ninety-five (95) percent of the maximum dry density obtained by the Standard Proctor compaction test (ASTM D-698) or by Texas Highway Department procedure TEX-113-E.

Flexible Base

We recommend that six inches of flexible base be used in light traffic pavement. Flexible base should be crushed rock meeting the requirements of the current Texas Department of Transportation (TDot) Specifications, Item 248, Type B, Grade 2. Base materials should be compacted to densities equivalent to ninety-five (95) percent of the maximum density obtained by the Modified Proctor compaction Test (ASTM D-1557) or by TDot procedure TEX-113-E.

Hot Mix Asphaltic Concrete Pavement

Minimum of two inches of asphaltic concrete surface are recommended for pavement. Hot mix asphaltic concrete (HMAC) materials should meet the requirements of The TDot specifications, Item 340, Type "D" mix. In addition, a crushed aggregate should be specified for the HMAC; the field density should be between ninety-five (95) and ninety-nine (99) percent of the laboratory maximum density.

Drainage

Proper perimeter drainage should be provided. If landscape features are considered near the pavement area, we recommend the drainage discharge should be diverted into sewers or above grade on the top of the pavement, minimizing water infiltration below the pavement area.

GENERAL REMARKS

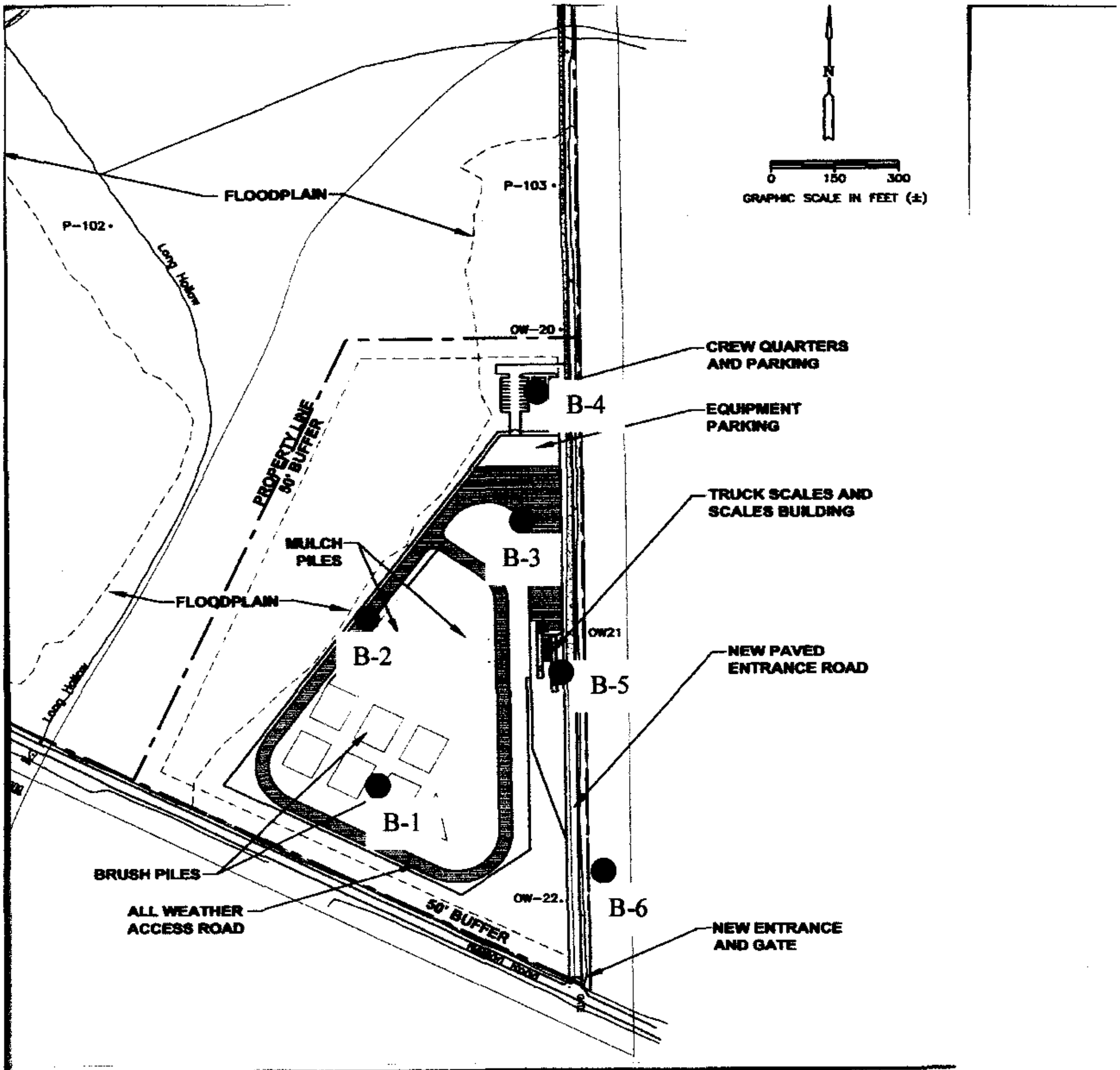
Limitations

The evaluations and conclusions submitted in this report are based, in part, upon the information obtained from the six test borings. Variations in soil conditions may occur between or beyond the borings. Transition lines shown on the boring logs are approximate and actual transitions between soil types may be gradual. Soil samples not altered by laboratory testing will be retained for 30 days. Then, unless we are directed otherwise, they will be discarded. If the nature or design of the project change, the conclusions and recommendations in this report should be reviewed by the soils engineer and, if necessary, modified. We can provide construction materials testing during construction to maintain quality assurance.

This report has been prepared for the exclusive use of HES Engineered Services and Solutions for specific application to the Nelson Brush Site in San Antonio, Texas. Soil sampling and testing and engineering evaluations follow accepted engineering practices. No other warranty, expressed or implied, is made. Additional information regarding the uses and limitations of engineering reports is included in the appendix.

APPENDIX

Soil Boring Location Plan
Log of Borings
Symbols and Terms Used on Boring Logs
Sieve Analysis Results
Field and Laboratory Testing Procedures
Important Information About Geotechnical Engineering Reports
Recommended Specifications for Placement of Compacted Fill



● Soil boring locations
Drilled on October 5 and 12, 2010

SOIL BORING LOCATION PLAN	PROJECT: NELSON BRUSH SITE PROJECT LOCATION: SAN ANTONIO, TEXAS PROJECT NUMBER: 10288
Geotechnical Consultants, Inc., 11918 Warfield Drive, San Antonio, Texas 78216	

LOG OF BORING NUMBER B-1

PROJECT: Nelson Brush Site
DATE: October 5, 2010
WEATHER: Clear and cool
LOCATION: San Antonio, Texas
TYPE BORING: Solid Stem Auger
GROUNDWATER OBSERVATIONS: No water encountered
ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	N/(Qp)	SOIL TYPE	DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
2	S	(4-1/2+)	\\\\	Hard, dark brown, slightly gravelly, silty CLAY (CH)	22	53	31			
4	P	50-5"	\\\\							
6	P	40	////		8					
8	P	50-5.6"	////	(CL)	9	24	12			
10	P	50-3.6"	////		6					
12				Weathered LIMESTONE						
14	P				8					
16				Boring Terminated						
18										
20										
22										
24										

w - Moisture Content (%)
LL - Liquid Limit
-200 - Silt and Clay Fraction
N - Standard Penetration Resistance
PI - Plasticity Index
Qp - Hand Penetrometer Test (TSF)
Qu-Unconfined Compression (TSF)

LOG OF BORING NUMBER B-2

PROJECT: Nelson Brush Site

DATE: October 5, 2010

WEATHER: Clear and cool

LOCATION: San Antonio, Texas

TYPE BORING: Solid Stem Auger

GROUNDWATER OBSERVATIONS: No water encountered

ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	N/(Qp)	SOIL TYPE	DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
0–2	S	(3-1/2)	////	Very stiff to hard, brown, sandy, silty CLAY (CL)	21					
2–4	S	(3)	////		15					
4–6	S		////		15			74.5		
6–8	S	(4-1/2+)	////		15	40	23			
9–10	P	43	////	Hard, dark tan, sandy, silty CLAY (CL)	10					
14–15	P	79	////		7					
19–20	P	41	////		8	20	8			
22.5–24				Weathered LIMESTONE						
24–25	P	75								
				Boring Terminated						

w - Moisture Content (%)
N - Standard Penetration Resistance
Qu-Unconfined Compression (TSF)
LL - Liquid Limit
PI - Plasticity Index
-200 - Silt and Clay Fraction
Qp - Hand Penetrometer Test (TSF)

LOG OF BORING NUMBER B-3

PROJECT: Nelson Brush Site
DATE: October 12, 2010
WEATHER: Clear and cool
LOCATION: San Antonio, Texas
TYPE BORING: Solid Stem Auger
GROUNDWATER OBSERVATIONS: No water encountered
ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	N/(Qp)	SOIL TYPE	DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
2	P	14	\\\\	Very stiff to hard, dark brown, silty CLAY (CH)	14					
4	S	(4-1/2+)	\\\\		13					
6	P	28	////	Hard, dark tan, silty CLAY with calcareous deposits (CL)	10					
8	P	28	////		8	27	15			
10	P			Weathered LIMESTONE	7			55.7		
12				Boring Terminated due to the limestone						
14										
16										
18										
20										
22										
24										

w - Moisture Content (%)
LL - Liquid Limit
-200 - Silt and Clay Fraction
N - Standard Penetration Resistance
PI - Plasticity Index
Qp - Hand Penetrometer Test (TSF)
Qu-Unconfined Compression (TSF)

LOG OF BORING NUMBER B-4

PROJECT: Nelson Brush Site
DATE: October 12, 2010
WEATHER: Clear and cool
LOCATION: San Antonio, Texas
TYPE BORING: Solid Stem Auger
GROUNDWATER OBSERVATIONS: At approx. 25-feet
ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	N/(Qp)	SOIL TYPE	DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
2	P	17	////	Hard, dark brown, silty CLAY (CL)	18					
4	P	16	////		16	39	19			
6	P	24	////	Hard, tan, silty CLAY (CL)	9					
8	P	27	////		6					
10	P	44	////		9	24	13			
12			////							
14	P	41	////		9					
16			////							
18			////							
20	P	27	////	After 24 Hours, water stabilized	13	27	14			
22			////							
24	P	50-5"	////		27					
				Boring Terminated						

w - Moisture Content (%)
N - Standard Penetration Resistance
Qu-Unconfined Compression (TSF)
LL - Liquid Limit
PI - Plasticity Index
-200 - Silt and Clay Fraction
Qp - Hand Penetrometer Test (TSF)

LOG OF BORING NUMBER B-5

PROJECT: Nelson Brush Site
DATE: October 12, 2010
WEATHER: Clear and cool
LOCATION: San Antonio, Texas
TYPE BORING: Solid Stem Auger
GROUNDWATER OBSERVATIONS: No water encountered
ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	SOIL TYPE N/(Qp)		DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
0-2	S	(4-1/2+)	////	Hard, brown, slightly gravelly, silty CLAY (CL)	21					
2-4	S	(4-1/4)	////		19	42	22			
4-6	S	(4-1/2+)	////		16					
6.5-8	P	18	////		12					
8.5-10	P	16	////		13					
10-14			////							
14-15	P	50	////		8			57.9		
15-17				Weathered LIMESTONE						
17				Boring Terminated						

w - Moisture Content (%)
N - Standard Penetration Resistance
Qu-Unconfined Compression (TSF)
LL - Liquid Limit
PI - Plasticity Index
-200 - Silt and Clay Fraction
Qp - Hand Penetrometer Test (TSF)

LOG OF BORING NUMBER B-6

PROJECT: Nelson Brush Site

LOCATION: San Antonio, Texas

GROUNDWATER OBSERVATIONS: No water encountered

DATE: October 13, 2010

WEATHER: Clear and cool

TYPE BORING: Solid Stem Auger

ELEVATION: Not determined

DEPTH (FT.)	SAMPLES	N/(Qp)	SOIL TYPE	DESCRIPTION AND COMMENTS	w (%)	LL	PI	-200 (%)	Qu TSF	UNIT DRY WEIGHT (PCF)
0–1.3				16" ATB						
2			////	Hard, dark brown, silty CLAY						
4	S	(4-1/2+)	////		20					
6	P	21	////	Hard, tan, slightly gravelly, silty CLAY (CL)	13					
8	P	22	////		10	31	16			
10	P	38	////		13					
12			////							
14	P	65	////		12					
16			////							
18			////							
20	P	50	////		14	40	22			
22			////							
24	P	39	////		13					
				Boring Terminated						

w - Moisture Content (%)
N - Standard Penetration Resistance
Qu-Unconfined Compression (TSF)
LL - Liquid Limit
PI - Plasticity Index
-200 - Silt and Clay Fraction
Qp - Hand Penetrometer Test (TSF)

SYMBOLS AND TERMS USED ON BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM			
GRAVELS More than half of coarse fraction larger than No. 4 sieve size		GW	Well graded gravels or sand and gravel mixtures, little or no fines.
		GP	Poorly graded gravels or sand and gravel mixtures, little or no fines.
		GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
SANDS More than half of coarse fraction smaller than No. 4 sieve size		SW	Well graded sands or gravelly sands, little or no fines.
		SP	Poorly graded sands or gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand-silt mixtures.
		SC	Clayey sands, poorly graded sand-clay mixtures.
SILTS AND CLAYS Liquid Limit less than 50%		ML	Inorganic silts and very fine sands of low to medium plasticity.
		CL	Inorganic clays of low to medium plasticity.
		OL	Organic silts and organic silty clays of low plasticity.
SILTS AND CLAYS Liquid Limit more than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts.
		CH	Inorganic clays of high plasticity.
		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS	——	Pt	Peats and other highly organic soils.

TYPE OF TEST OR SAMPLE	
A - Auger sample	C - Rotary Coring Sample
P - Split Barrell Sample with Standard Penetration	S - Thin Wall Tube (Shelby Tube) Sample
	T - THD Cone Penetrometer Test

CONSISTENCY OF COHESIVE SOILS

Descriptive Term	Unconfined Compressive Strength (TSF)	Standard Penetration Resistance (BL/FT)
Very Soft	Less than 0.25	Less than 1
Soft	0.25 - 0.50	1 - 2
Firm	0.50 - 1.00	2 - 4
Stiff	1.00 - 2.00	4 - 8
Very Stiff	2.00 - 4.00	8 - 16
Hard	Greater than 4.00	Greater than 16

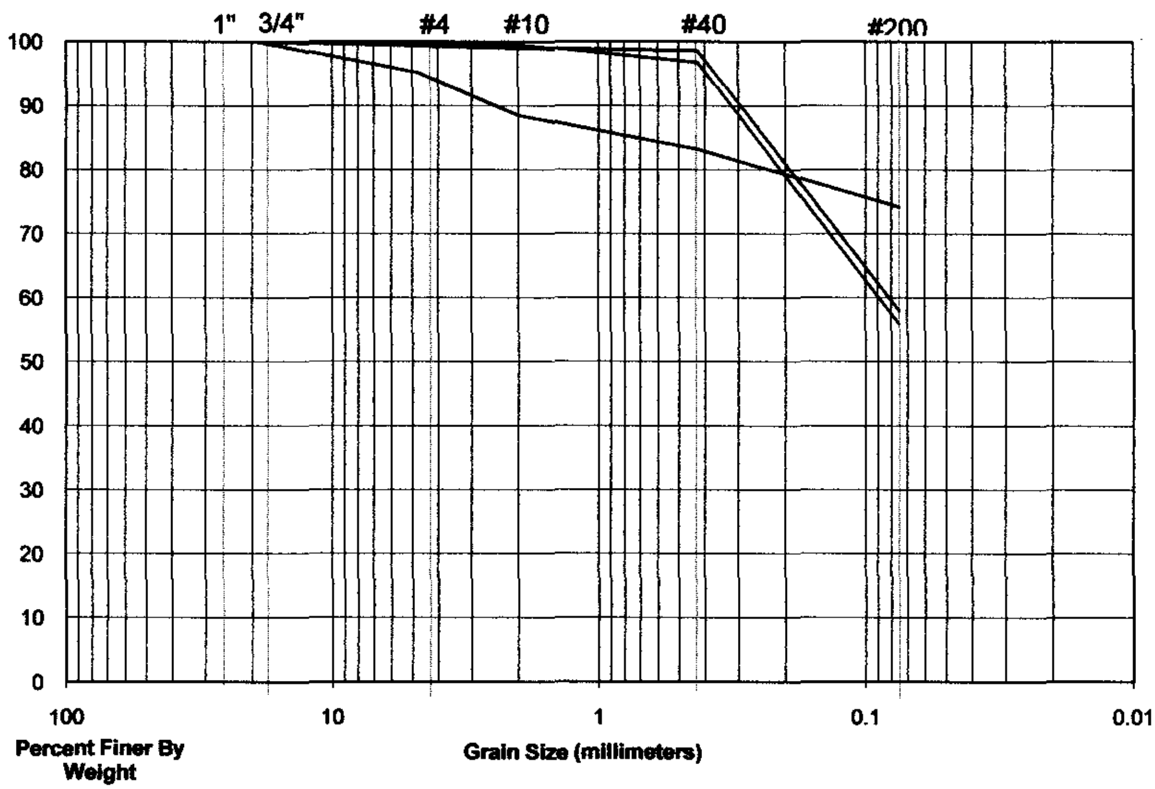
RELATIVE DENSITY OF COHESIONLESS SOILS

Descriptive Term	"N" Value (BL/FT)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

RELATIVE PROPORTIONS

Proportional Term	Percentage by Weight
No Term	Less than 5
Slightly	5 - 12
—ly	12 - 35

GEOTECHNICAL CONSULTANTS, INC.



GRAVEL		SAND			FINES
COARSE	FINE	COARS	MEDIUM	FINE	

Boring	Depth	W	LL	PL	PI	Description
B-2	4' to 6'	15	--	--	--	Brown, sandy, silty CLAY (CL)
B-3	8' to 10'	7	--	--	--	Weathered LIMESTONE
B-5	13.6' to 15'	8	--	--	--	Brown, slightly gravelly, silty CLAY (CL)

SIEVE ANALYSIS RESULTS

Geotechnical Consultants, Inc., 11918 Warfield Drive, San Antonio, Texas 78216

PROJECT: NELSON BRUSH SITE
PROJECT LOCATION: SAN ANTONIO, TEXAS
PROJECT NUMBER: 10288

FIELD AND LABORATORY TESTING PROCEDURES

FIELD TESTING

A. Boring Procedure Between Samples

The borehole is extended downward, between samples, by continuous flight, hollow or solid stem augers or by rotary drilling techniques using bentonite drilling fluid or water.

B. Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586)

This sampling method consists of driving a two-inch outside diameter split barrel sampler using a 140 pound hammer freely falling 30 inches. The sampler is first seated six-inches into the material to be sampled and then driven an additional 12-inches. The number of blows required to drive the sampler the final 12-inches is known as the Standard Penetration Resistance. Recovered samples are first classified as to color and texture by the driller. Later, in the laboratory, the driller's field classification is reviewed by the soils engineer who examines each sample.

C. Thin-walled Tube Sampling of Soils (ASTM D-1587)

This method uses hydraulically pushed or hammer driven thin walled steel tubes, usually three-inches in diameter, penetrating into the soils to be sampled. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.

D. Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of augering a hole and removing soil samples from the auger flight or bit at five-foot intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where determining only the approximate subsurface profile is sufficient.

E. Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water is used to remove the cuttings and to cool the bit. Normally, a two-inch outside diameter by 1-3/8 inch inside diameter (NX) coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and in the laboratory and the cores are stored in partitioned boxes. The core recovery is the length of material recovered and is expressed as a percentage of the total distance penetrated.

LABORATORY TESTING

A. Atterberg Limits - Plasticity Tests (ASTM D-4318)

Atterberg Limits determine the soil's plasticity characteristics. The soil's Plasticity Index (PI) represents this characteristic and is the difference between the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid. The PL is the moisture content at which the soil begins to lose its plasticity. The test results are presented on the boring logs beside the appropriate sampling information.

B. Particle Size Analysis (ASTM D-421, D-422, D-1140)

Grain size analysis tests are performed to measure the particle size and distribution of the samples tested. The grain size distribution of the soil coarser than the Standard Number 200 (0.074 mm) sieve was determined by passing the sample through a standard set of nested sieves. The results are given on the gradation sheets in the appendix.

C. Moisture Content (ASTM D-2216)

Moisture content of soil is the ratio, expressed as a percentage, of the weight of water in a given soil mass to the weight of solid particles. It is determined by measuring the wet and oven dry weights of a soil sample. The test results are presented on the boring logs.

D. Unconfined Compression Test (ASTM D-2166)

The unconfined compressive strength of soil is determined by placing a section of an undisturbed sample into a loading frame and applying an axial load until the sample fails in shear. The test results are presented on the boring logs beside the appropriate sampling information or on separate sheets.

E. California Bearing Ratio (CBR) (ASTM D-1883)

The CBR test is done by compacting soil in a six-inch diameter mold at the desired density, soaking the sample for four days under a surcharge load approximating the pavement weight and then testing the soil in punching shear. A two-inch diameter piston is forced into the soil to measure the resistance to penetration. The CBR is the ratio of the actual load required to produce 0.1 inches of penetration to that producing the same penetration in a standard crushed stone.

F. Swell Test (ASTM D-4546, Modified)

Swell testing is performed by confining a one inch thick specimen in a 2-1/2 inch diameter stainless steel ring and loading the specimen to the approximate overburden pressure. The test specimen is then inundated with distilled water and allowed to swell for 48-hours. Volumetric swell is measured as a percentage of the total volume and is converted mathematically to linear swell.

G. Compaction Test (ASTM D-698 or ASTM D-1557)

Compaction testing consists of compacting soil in a steel mold at varying moisture contents. Either three or five layers are compacted using a hammer weight and number of blows per layer that vary with the different test procedures. The Standard Proctor (ASTM D-698) is used for cohesive soils and the Modified Proctor (ASTM D-1557) is used for granular soils. TEX-113-E method is applicable to both soil types with the procedure varying with the soil's plasticity. The data is plotted and the maximum unit weight and optimum moisture content determined. The test results are given in the appendix with a notation of the test method used.

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* Latest adopted test procedure used.

IMPORTANT INFORMATION ABOUT GEOTECHNICAL ENGINEERING REPORTS

The following observations and suggestions are provided to help you better utilize your geotechnical engineering report and to reduce construction problems and delays related to soil and groundwater conditions.

REPORT IS BASED UPON SPECIFIC SITE AND PROJECT

A geotechnical report is based on a subsurface exploration conducted on a specific site and planned using specific project information. The project information typically includes structure size and configuration, type of construction, and general location on the site. Limitations, such as existing buildings or utilities, specific foundation requirements for the structures, budget limitations, and the level of risk assumed by the client may affect the scope of the exploration.

Since the report applies to a specific structure and site, the geotechnical report should not be used in the following circumstances unless the geotechnical engineer has reviewed the changes and concurs in the use of the report.

- When the nature of the proposed structure is changed, such as an office building instead of a warehouse or parking garage, or a refrigerated warehouse instead of one that is not refrigerated.
- When the size, configuration, or floor elevation is changed.
- When the location of the structure on the site is changed.
- When there is a change of ownership.

FINDINGS ARE PROFESSIONAL ESTIMATES

The actual subsurface conditions are determined only at the boring locations and only at the time the samples are taken. The information is extrapolated by the geotechnical engineer who then renders professional opinions regarding the characteristics of the subsurface materials, the behavior of the soils during construction, and appropriate foundation designs. No exploration, however complete, can be assured of sampling the entire range of soil conditions. The soils may vary between or beyond the borings and stratum transitions may be more gradual or more abrupt, and all the types of soil and rock existing on the site may not be found in the borings. The geotechnical engineer is often retained during construction to evaluate variances and recommend solutions to problems encountered on the site

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SUBSURFACE CONDITIONS CAN CHANGE

Grading operations on or close to the site, floods, groundwater fluctuations, utility construction, and utility leaks are among the events which can change the subsurface conditions. The geotechnical engineer should be kept apprised of such events.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

A geotechnical report may have been made to evaluate foundation alternatives only, for preliminary site evaluation, or for other limited purposes. The exploration may also have been limited by the direction of the client, budget limitations, or the level of risk assumed by the client. Therefore, no one other than the original client should use the report for its intended purpose or other purposes without conferring with the geotechnical engineer.

GEOTECHNICAL REPORTS ARE SUBJECT TO MISINTERPRETATION

Geotechnical reports are based on the project information available at the time the report was made and the judgement and opinions of the geotechnical engineer. This specialized information is subject to misinterpretation by other design professionals, contractors and owners. The geotechnical engineer should be retained during the design process to interpret the recommendations and review the adequacy of the plans and specifications relative to geotechnical issues. The boring logs should not be separated from the geotechnical report but, rather, the entire report should be made available to the contractors and others needing this information.

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RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

1. General

The soils engineer shall be the representative of the owner to control the placement of compacted fills. The soil engineer will approve the subgrade preparation, the fill materials, the method of placement and compaction, and give written approval of the compacted fill.

2. Preparation of the Existing Ground

All topsoil, plants, and other organic material will be removed. Exposed clay surfaces should be scarified, moistened if necessary, and compacted in the manner specified for subsequent layers of the fill.

3. Fill Material

Fill soil should have a liquid limit of 30 or less and a plasticity index of less than 12. The fill will contain no organic or other perishable material, and no stones larger than six inches. Fill material will be approved by the soil engineer.

4. Placing Fill

Fill materials should be placed in horizontal layers not exceeding eight inches thickness after compaction. Successive loads of material will be dumped to secure even distribution, avoiding the formation of layers or lenses of dissimilar materials. The contractor will route his hauling equipment to distribute travel evenly over the fill area.

5. Compaction of Fill

Moisture Control: The moisture content of the fill material must be distributed uniformly throughout each layer of the material. The allowable range of moisture content during compaction is plus two (+2) and minus two (-2) percentage points of the optimum moisture content. The contractor may be directed to add necessary moisture to the material either in the borrow area or upon the fill surface or to dry the material, as directed by the soil engineer. The drying of cohesive soils between lifts to moisture contents less than 70-percent of optimum before the placement of subsequent lifts should be avoided or the fill reworked at the proper moisture content.

Compaction: The material in each layer will be compacted to obtain proper densities. Compaction by the hauling equipment alone will not be considered sufficient. Structural fills, including pavement subgrade, subbase and base, should be compacted to densities equivalent to the percentages of the Standard Proctor (ASTM D-698) or the Modified Proctor (ASTM D-1557) maximum dry density listed in Table 1. The Texas Department of Transportation Method TEX-113-E compaction test, which varies the compactive effort with soil type, may be substituted for the Standard or Modified Proctor methods and the percentages listed in Table 1 used.

RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL (cont.)

[illegible]		
AREA	PERCENT COMPACTION	
	Fine Grained Soils ASTM D-698 Standard Proctor	Coarse Grained Soils ASTM D-1557 Modified Proctor
Within five feet of building lines, under footings, floor slabs, slab-on-grade foundations and structures attached to buildings (i.e. walls, patios, steps)	95	95+
More than five feet beyond building lines, under walks, and fill areas to be landscaped	90	90
Pavement subgrade and subbase, including lime treated soils	95	95+
Flexible base	N/A	98

Soils classified as coarse grained soils are those with more than fifty percent, by weight, retained on the No. 200 Standard Sieve and with plasticity indices of less than four.

6. Compaction Testing

Field density tests for the determination of the compaction of the fill should be performed by a qualified testing laboratory according to recognized procedures for making such tests. A representative number of tests should be made in each compacted lift at locations selected by the soil engineer or his representative. For general structural and paving fills, we suggest one test per 3,000 square feet per lift with a minimum of three tests per lift.